

enough to set up malignant disease, more especially where there is any predisposing cause.

Waldeyer and other observers have arrived at the conclusion that all cases of uterine cancer are of epithelial origin, that is, commencing upon the surface. Dr. Emmet says that out of two thousand four hundred and forty-seven women in his private practice, who applied to him for some form of sexual disorder, fifty-three cases, or 2.19 per cent., were cancer of the uterus. Of these fifty-three cases, fifty-one had borne a number of children each, and the other two had suffered from criminal abortion; he also says that he has never known a woman to have any form of epithelial cancer of the uterus who had not at some time been impregnated. These are, to my mind, sufficiently good reasons for repairing all fissures of the cervix, when irritable and accompanied by hyperplasia and increased discharge.

From the reports of cases that I have read, and from my own experience, I have been led to the following conclusions:—

First. Do not undertake the operation of entire removal of the uterus if the surrounding tissues are involved in the disease, or the uterus is at all fixed, for the operation is then very difficult, and the disease would certainly return at the seat of operation.

Second. Operate by the vaginal method, it being a much safer one.

Third. Leave the opening made by the removal of the uterus open, so as to allow perfect drainage, there being apparently no disposition to prolapse of the small intestine.

Fourth. Keep a self-retaining catheter in the bladder, in order to avoid its distension, and to prevent the too frequent disturbance of the patient.

I would also suggest that, where it can be done, enough of the diseased structure be removed for a microscopical examination, before the decision is made final as to the advisability of an operation.

ARTICLE XIII.

CENTRAL COLOUR-SCOTOMA—THE ERROR OF ORDINARY TESTS. By JAMES L. MINOR, M.D., Assistant Surgeon to the N. Y. Eye and Ear Infirmary.

THE method ordinarily employed for detecting central colour-scotoma is to have the patient direct the eye under examination to a small spot on a dark background, 30 cm. from the eye. A small piece of cardboard, about 12 mm. in diameter, of the colour to be tested, is slowly brought from the peripheral portions of the visual field towards the centre, and the point at which the colour disappears is noted. This is repeated for the various meridians, and these points, when connected with each other, will

form the boundary line of an area in which the colour is not recognized—a central colour-scotoma—which is accurately and clearly delineated.

In testing for partial central colour-scotoma, or a circumscribed area in the centre of the visual field, over which the perception of a given colour is dulled or diminished but not obliterated, it is customary to adopt much the same procedure, using in this case, however, a small bit of cardboard for fixation, of the same colour as that used for testing the more peripheral colour sense, thus allowing a comparison to be drawn between the colour looked directly at, and that seen in the eccentric portions of the visual field. The small movable coloured card is slowly carried from the periphery towards the centre, and when a point is reached at which this appears of a brighter colour than the central card of fixation, it is noted. This is repeated for the various meridians, and these points are then connected. Thus a boundary line is established which maps out a circumscribed area in the centre of the field of vision over which the colour perception is duller than in surrounding zones—a partial central colour-scotoma.

This way of testing for absolute colour-scotoma furnishes an accurate result, but the method can be improved upon, while that described for partial colour-scotoma is open to the gravest errors. For we there depend upon the comparative brightness of two pieces of card of the same colour seen in different parts of the field of vision; the one placed centrally, and under constant observation, the other in various parts of the field in constantly changing positions. While it is a fact that the normal eye does recognize colours most accurately at the macula lutea, which corresponds to the point of fixation, it admits of easy proof that the most fallacious results may be obtained, if implicit reliance is placed upon it, under all circumstances. And these circumstances are entirely left out of consideration in testing as described above. I refer to the consequences of fatigue of the retina, the importance of which may be judged of by trying the following simple experiments:—

First, a piece of red cardboard, 6 or 8 cm. square, is held before the eye at a distance of about 30 cm., and the eye is fixed upon a piece of black cardboard, 2 cm. square, held over the centre of the red card. After looking at this intently for a half minute or more, the bit of black card is quickly removed, and it will be observed that the space which had been covered by it is of a much brighter red colour than the surrounding red of the card—this bright spot being clearly delineated. The explanation of this is to be found in the fact that all that portion of the retina which had been exposed to the red rays became fatigued by their constant impact, while the small spot which corresponded to the black card was shaded almost entirely from all rays, leaving the retina at that point, when the black card was removed, fresh to respond to the red rays which then impinged upon it.

Second. A piece of black cardboard, 6 or 8 cm. in diameter, with a small central red card, 2 cm. in diameter, for fixation, is held at 30 cm. from the eye, which is directed to the red centre. After a few moments, both the black and the red cards are removed, and a large piece of solid red card is quickly substituted. It will be observed that a dull red or brownish spot, corresponding in size and position to the space which had been covered by the central bit of red card, is seen upon the now red field. In this instance, that portion of the retina which received the image of the small red card, became fatigued, the *red nerves* becoming exhausted—while the remaining portions which had been shielded by the black card, responded, with that vigour which rest affords, to the red rays suddenly falling upon its surface, creating the anomalous condition of the appearance of a bright red periphery with a dull brownish centre, when viewing a card of uniform red color. The contrast thus afforded by a *simultaneous* comparison of the apparently different colours is striking. It is just this condition that is brought about when we attempt to map out a partial colour-scotoma by the method of testing usually employed. The central coloured card which is used for fixation and comparison does not change its position, hence its image falls upon a part of the retina, which, though in the normal condition, is extremely sensitive to changes in colour, soon becomes exhausted, and it is then unable to compete in colour-perception with the fresh and untired parts of the retina more distant from the centre, which, under ordinary circumstances, are deficient in colour-perception as compared with the centre. Tested in this way, the scotoma (partial) enlarges and becomes more pronounced, *pari passu*, with the retinal exhaustion of the centre, which increases every moment during the test.

To obviate the central retinal exhaustion, and at the same time to furnish a means of comparison between the central and peripheral colour perception, I have made disks of coloured cardboard about 30 cm. in diameter, which are used as follows: The patient is directed to look at the centre of the coloured disk, and if either an absolute or a partial scotoma exists, it will be plainly mapped out upon the card, where the patient can himself trace the outlines; and this may be kept as a permanent record of the case; or, if tracing-paper of sufficient transparency be at hand, this may be placed over the coloured disk, and the tracing be done upon it, rather than upon the cardboard, which can be preserved for further use. If neither the disk nor coloured cardboard of sufficient size be at hand, we may take the two small bits of cardboard used in ordinary tests, and compare the acuteness of colour perception in various parts of the field of view by placing them, at the *same time*, in different positions, thus allowing a *simultaneous* comparison between them.

A very delicate test is to use a disk of a compound colour,—pink, for instance, which is made up of blue and red, and it is placed among the reds

by ordinary observers; with the red blind, the blue only is recognized, and the pink is by them referred to the blues. Hence an individual with a complete or total central colour-scotoma for red would, on viewing a pink disk, have the scotoma appear as a blue spot, surrounded by the pink, which is correctly perceived in the more peripheral parts of the fundus. A partial or incomplete central scotoma for red, would appear blue in proportion to the blending of the perception of red.

139 EAST 30TH ST., NEW YORK, N. Y.

ARTICLE XIV.

IS THE OVARIAN CELL PATHOGNOMONIC?¹ By W. A. EDWARDS, M.D.,
of Philadelphia.

THE accurate diagnosis of ovarian tumour is of vital importance, as mistakes are by no means rare, even among our most skilful diagnosticians. For example, John Hunter diagnosticated an ovarian tumour, and tapped the woman, who a short time afterwards was delivered of a child showing the marks of the trocar on its shoulder.

Dr. Washington Atlee mentions a case of pregnancy mistaken for ovarian tumour; the woman was tapped, causing a miscarriage of twins. Mr. Spencer Wells, with his great record in ovariectomy, is obliged to acknowledge twenty-nine mistakes. Of eighty-one cases in which the operation was attempted (*The Principles and Practice of Modern Surgery*, Robert Druitt) no tumour whatever was found in five, and in six others it was not ovarian.

The means of preventing these mistakes are well known, as: Inspection, palpation, percussion, auscultation, the spectroscope, the pulsations of the abdominal aorta (which, according to Dr. Walter F. Atlee,² are pathognomonic), chemical analysis, and the microscope. All methods but the last-named are so well known and tried, that it will not be necessary to discuss them here; it is to the latter, the microscope, that the profession has looked to save it from these embarrassing mistakes. The sac of the tumour presents nothing of a typical or diagnostic value, as the tumour is an epithelial epigenesis of the Graafian vesicle.

But the fluids of the ovarian tumours reveal abundance of cell forms, thought by many to be characteristic. These fluids, under the microscope,

¹ In the preparation of the accompanying paper, I have examined in all about three hundred fluids, both from the American and European hospitals, and from the practice of Dr. Walter F. Atlee, Prof. William Goodell, and the Pathological Laboratory of Dr. Henry F. Formad. The drawing was made under a power of about 480 diameters.

² Amer. Journal Med. Sciences.